

Study of the Fertility and Morphostructural of *Echinococcus Granulosus* in Algeria

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Abstract

An examination of fertility of 1200 hydatid cysts found in postmortem examination of 350 bovine carcasses (450 cysts), 1230 sheep (630kystes), 787 (120kystes) goats slaughtered at abattoirs in the province of Djelfa, these cysts were localized in the liver and lung most of species slaughtered were female sex oriented adult age at slaughter for various reasons, the work began in January 2009 until January 2011, samples were taken after post-mortem examination of the bodies has tropism for hydatidosis, organ samples were preserved in formalin or alcohol 92 °, and kept cool, and the hydatid fluid was aspirated with a syringe and kept in petri dishes. Our results showed that the total fertility rate was (44.44%, % 50.80, 22.50 %) rates of infertility (27.10 %, 3.80 %, 77.50 %) and calcified cysts was (28.40 %, 11.10 %, 00 %) respectively for bovine, ovine, caprine, we considered that any cyst containing protoscoleces (hydatid sand) was fertile and those acéphalocystes (without protoscoleces) are sterile. However, we studied the morphology and consistency of cysts found, it was observed that the form was the most unilocular Unikystique rependue, whereas the form unilocular polycystic was observed in younger subjects, and those with advanced age had cysts or calcified or with the casein, our results are consistent with several authors in the literature.

Keywords

Hydatid cyst, fertile, sterile, calcified, unilobular unikystique, Unikystique polycystic

INTRODUCTION

Hydatid disease is a major public health problem and economic found, to varying degrees. Despite the attention it has received by public health officials, veterinarians, specialists helminthology and other scientists, especially in endemic areas, yet there are significant gaps in our knowledge of this parasitic infection hinder efforts to its treatment and prevention, and even control the disease. In the following an attempt to highlight current issues in research and suggest echinococcosis instructions that future studies can be conducted most useful. In Algeria, the sheep strain of *E. granulosus* is the most implicated in human infection (Paredes R *et al*, 2007), although a camel strain was also highlighted, with possible

crosses between strains (Regassa F *et al*, 2010). As for socio-ecological currently associated with risk of hydatidosis in the Algerian population, they have not been studied, the last publication dealing with the general epidemiology of the infection in Algeria in 1994 (Cheriet and Lagardère, 1994). However, several elements grow to update knowledge of the conditions for the development of the disease: first, that hydatidosis in Algeria is still a significant problem of public health (Ait Assa *et al*, 2006), then the rapidly evolving situation and living conditions of the Algerian population, particularly in relation to the development of urban housing and declining share of the sparse population (Martinez C *et al*, 2005) finally, the fact that traditional practices, including the family

slaughter sheep, recognized as being involved in the contamination of Man (Rausch RL,1995)

MATERIALS AND METHODS

Sampling protocol. The work was conducted during October 2011 to April 2012 in the province of Djelfa at three abattoirs (slaughterhouse 02 killings and 01), according to the agreement of the veterinary inspector wilaya and contractors of these places of sacrifice, and in difficult conditions of transport at the municipal slaughterhouse, 2367 carcasses (350 cattle, 1230 sheep and 787 goats) were examined post mortem. Firstly we have shared the animals before slaughter in the first two batches contained animal parasites (albendazol) and followed by a veterinarian and the second is made up of animals or not followed regularly dewormed.

During this period the animals slaughtered were dominated by the female sex for virtually all bovine ovine and caprine animals aged over 02 years, once the post mortem is done we proceeded to samples of livers and lungs after each other is respecting the advance of the slaughter chain, the work stoppage was temporary when we performed blood tests. These organs were examined on site in

the first place. Note: This work was not continuous in time because it was compared to days coincided with the weekly market animals slaughtered at the slaughterhouse.

Criterion evaluated at slaughter. For each animal and for all species examined macroscopically livers and lungs was performed by palpation and incision so a note:

- Presence or not of cysts per organ.
- Numbers of cysts per organ.
- Or stage and consistency of each cyst.

Classification of cysts was made by macroscopic appearance and palpation and opens it:

Laboratory criteria. Samples cysts were transported to the laboratory in large and small sachets depends on the volume of the cyst found, then they are cleaned and stored in boxes containing formalin or alcohol 92 was labeled or mentioned identification the animal (species, age, gender, body taken). For hydatid fluid is aspirated with a syringe and placed in boxes for consideration perished fertility.

RESULTATS

Table 01 Consistency of hydatid cysts

	Cattle	Sheep	Goat
Fertile cyst	44,44 %	50,8 %	22,5 %
Sterile cyst	27,1 %	38,1 %	77,5 %
Calcified cyst	28,46 %	11,1 %	0 %

Table 02 Consistency of hydatid cysts in relation to the infected organ

Species	Infected organ	Total hydatid cyst examined	Average KH / body	Total fertile hydatid cyst	Total hydatid cyst sterile	Total calcified hydatid cyst
Cattle	Liver	145	20	65	05	75
	Lung	220	15	28	104	88
Ovine	Liver	432	45	256	201	81
	Lung	302	32	148	105	49
Goat	Liver	75	02	20	60	00
	Lung	26	03	10	15	01

Table 03 Morphological parameters in cattle species

Body parasitized	Hydatid cyst morphology by body (Cm)									Consistency of the cyst (Cm)					
	Unilobular unicystic			Unilobulaire polycystic			Multilobular unicystic			Unilobular unicystic			Unilobulaire polycystic		
	1-5	5-10	10-20	1-5	5-10	10-20	1-5	5-10	10-20	1-5	5-10	10-20	1-5	5-10	10-20
Liver	+++	+	+	+	+	—	—	—	—	+++	++	—	+++	—	—
Lung	++	++	+	++	—	—	—	—	—	++	+	—	+	++	—

Table 04 Morphological parameters in ovine species

Body parasitized	Hydatid cyst morphology by body(Cm)									Consistency of the cyst(Cm)					
	Unilobular unicystic			Unilobulaire polycystic			Multilobular unicystic			Caseous			Calcified		
	1-5	5-10	10-20	1-5	5-10	10-20	1-5	5-10	10-20	1-5	5-10	10-20	1-5	5-10	10-20
Liver	++	++	—	+++	++	—	—	—	—	+++	++	—	+	+	—
Lung	+++	+++	—	++	+	—	—	—	—	+	++	—	+++	+	—

Table 05 Morphological parameters in goat species

Body parasitized	Hydatid cyst morphology by body (Cm)									Consistency of the cyst(Cm)					
	Unilobular unicystic			Unilobulaire polycystic			Multilobular unicystic			Unilobular unicystic			Unilobulaire polycystic		
	1-5	5-10	10-20	1-5	5-10	10-20	1-5	5-10	10-20	1-5	5-10	10-20	1-5	5-10	10-20
Liver	+	++	—	+++	+++	—	—	—	—	+++	+	—	—	—	—
Lung	++	+++	—	+++	+++	—	—	—	—	+	+	—	—	—	—

**Photo 03** Unilobulaire unikystique form to caseous form of liver of cattle**Photo 04** (original): Fluid consistency of lung in sheep



Photo 05 (original): Unilobulaire Polykystique form of lung of poumon of sheep



Photo 06 (original): Calcified form of liver cyst of cattle

DISCUSSION

Hydatid disease is a parasitosis discovery slaughterhouse affecting all ruminants and other species, we include the cattle, the sheep, the goats, except that the sheep strain is infecting more compared to other strains.

The study here is a descriptive study that is part of the following monitoring and updating of the epidemiological situation of echinococcosis in *E. granulosus* in cattle, sheep and goats in the region DJELFA it based on the data provided by the inspection at slaughterhouses, in order to obtain the following information elements:

- The rate of infection in the lung and liver;
- The percentage of animals with cysts fertile;
- The percentage of animals with a massive infestation (> 10 cysts).

In addition cyst fertility is determined by the presence of free protoscoleces in the hydatid fluid and protoscoleces attached to the germinal layer, other parameters identification of cyst fertility such as the whitish layer thickness rated by germline (Bortoletti and Ferretti, 1978) the study of the formation of protoscoleces at the germinal layer of the hydatid cyst naturally infected *E. granulosus* is very important because it determines the fertility of the cyst, seen in both the diagnostic and therapeutic practice (Eckert *et al*, 1995) (Paredes *et al.*, 2007) (Galindo *et al.*, 2002).

According to our results, the fertility rate of the cysts in sheep was 50.8% followed by 44.44% in cattle with goats then 22.5%. (Table 01) knowing that animals slaughtered not been a deworming screen.

While sterile cysts are recorded in many of goats with sheep then 77.5% with 38.1%, while the cattle we found 27.1%, and finally bovine recorded over calcified cysts with the sheep (28.46% -11.1%) and 0% for goats, our results compared with those obtained by (Lahmar, S., 1999) for bovine they recorded on 450 cysts evaluated, 138 (30.67%) were fertile, 241 (53.56%) sterile, and 71 (15.78%) calcified also (Regassa F, Molla a, Bekele J.2012) found the cysts collected 874 total, 26.9% were fertile, sterile 47.3% and 25.9% of calcified cysts or purulent, according to (Berhe G, 2009). Whereas consistency cysts bitter Table (02) we found that the lung is the organ most affected by the liver hydatid cyst for bovine however the opposite was found in sheep and goat liver damage with more than lung, sheep is more concerned with fertility (404 cysts) with (306 sterile cysts) in cattle but is second Reproductive cysts (93 fertile cysts) against (109 sterile) and (163 calcified) on the goat we recorded 30 and 75 fertile cysts cysts sterile Table (02)

The liver is the organ containing more fertile cyst unlike lung bovine, ovine and caprine cysts and infertility has touched the lung especially for cattle and liver for both sheep and goats, and finally the lung cattle had more calcified cysts in the liver and lung, whereas sheep calcification was localized in the liver and finally to the goats we saw a calcified hydatid cyst lung. (Table 02)

The morphology of cysts found in organs cyst hydatid we noticed that in the bovine species (Table 03) that the lobular form united Unikystique is the

most answered more in the liver than in the lung a diameter between 1-5 Cm the lobular form united polycystic (Photo 05), which was much more marked in the lung with a diameter of 1-5 Cm and very few cases recorded for the liver always the same shape (Table 03) while the lobular form multi Unikystique has not been registered on the sheep (Table 04) we found that the lung is more affected by the lobular form united Unikystique (Photo 03) that the liver has a diameter between 1-10 Cm while the lobular form united Polycystic a diameter of 1-5 Cm multi lobular shape with zero Unikystique, the differences between the forms found in cattle and sheep is probably due to the regular presence of dogs campaign and even wandering in sheep mainly foxes and even the presence of that type of farming is extensive, the animals were kept in rooms built clay unprotected wild animals at night when it is cattle or less protection in buildings that are not in the standard set by the Ministry of agriculture and fishing Algeria.

The goats we noted otherwise in relation to both cattle and sheep because we recorded more than lobular form united Unikystique for lung than liver diameter of 1-10 Cm many cases, however, regarding the form united lobular polycystic both the liver and the lung with a diameter between 1-10Cm were recorded in our results.

For consistency was caseous or calcified caseous but the shape is the most common of the three species, however, we noticed that calcification was not recorded for goats (Table 3.4, 5).

CONCLUSION

The cyst remains a parasitic not cease to grow in sheep and cattle by the presence of fertile cyst which means that the means to fight against hydatidosis in Algeria are not well established.

The frequency of the Kingdom lobular form Unikystique unilocular and poly means lobular form of the species in this study hydatidosis is known for its tropism for both organs liver and lung than the rest of the organs that made with significant at this level, thus destroying a echinococcosis must know the breeder instilled recommendation and the general rules of the danger of the definitive host their livestock and therefore public health.

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